

Abstract

Methods of manufacture and use of phosphates of transition metals are described as positive electrodes for secondary lithium batteries, including a process for the

5 production of LiMPO_4 with controlled size and morphology, M being $\text{Fe}_x\text{Co}_y\text{Ni}_z\text{Mn}_w$, where $0 \leq x \leq 1$, $0 \leq y \leq 1$, $0 \leq w \leq 1$, and $x + y + z + w = 1$. According to an exemplary embodiment, a process is described for the manufacture of LiFePO_4 including the steps of providing an equimolar aqueous solution of Li^{1+} , Fe^{3+} and PO_4^{3-} , evaporating water from the solution to produce a solid mixture, decomposing the solid mixture at a temperature of

10 below 500°C to form a pure homogeneous Li and Fe phosphate precursor, and annealing the precursor at a temperature of less than 800°C in a reducing atmosphere to produce the LiFePO_4 powder. The obtained powders can have a particle size of less than $1\mu\text{m}$, and can provide superior electrochemical performance when mixed for an appropriate time with an electrically conductive powder.